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ABSTRACT

F. C. Bartlett's concept of "attitude" is used in this paper as a point of departure for the creation of a model of the complementary functioning of discursive and experiential memorial representation. The paper first discusses several of the memorial functions of experiential representation, in particular the integrative function related to the pervasive aspect of attitudes and the function of attitudes as "landmarks" for indexing and checking memories. The paper next examines one area that concerns itself with attitude-like processes--state-dependent memory. After exploring some of the effects on memory of a text produced by varying the experiential state of the reader, the paper argues that attitude-based processes are relatively more important in cases where prior knowledge does not provide a strong basis for connecting information. A brief outline of an inferential reconstruction model that incorporates knowledge of the world and pervasive experiential coloration in mutually facilitating interactive functioning is presented. (FL)

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Technical Report No. 258

ON THE ROLE OF PERVASIVE EXPERIENTIAL COLORATION IN MEMORY

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On the Role of Pervasive Experiential Coloration in Memory

The direction that research on text processing has taken in the last 15 years has been considerably influenced by a revival of interest in the work of Bartlett (1932). In his classic book, Remembering, he stressed the constructive nature of comprehension and recall. Data from, say, texts (and from explicit memories of texts) are cognitively transformed and augmented in service of a general principle of conventionalization: comprehenders and rememberers adjust their representations in some way to make them correspond to their knowledge and beliefs about the way the world is (or was). Bartlett suggested that two general bases guide this inferential process. The first is discursive knowledge of the world. This basis for inferential (re)construction (see Spiro, 1977) has been substantially and extensively investigated in the last 15-20 years by cognitive psychologists, computer scientists, and others working on issues of knowledge representation under the various rubrics schema, frame, script, and so on.

The second basis for inferential construction proposed by Bartlett is a kind of general impression that he called an "attitude." He considered an attitude to be "a complex psychological state or process which is very hard to describe in more elementary psychological terms. It is, however . . . very largely a matter of feeling, or affect" (p. 206). Bartlett found that when his subjects were trying to recall the stories they had read, an attitude was quite often the first thing they reported coming to mind, usually before specific details of the story appeared in consciousness (see p. 207). As substantial as has been the impact of Bartlett's first basis of construction, discursive knowledge of the world, investigation

of the role of attitude-like phenomena (i.e., experientially loaded general impressions of a whole) has been quite limited.

In this paper we attempt to correct this imbalance by discussing some of the memorial functions of experiential representation, in particular the integrative function related to the pervasive aspect of attitudes and the function of attitudes as "landmarks" for indexing and checking memories. First we briefly discuss the one area currently in vogue that concerns itself with attitude-like processes, state-dependent memory. We then go beyond the state-dependent approach to suggest some of the effects on memory for text of varying the experiential state of the reader. Here we emphasize the contrast between states which vary in affectivity and salience. We argue that attitude-based processes are relatively more important in cases where prior knowledge does not provide a strong basis for connecting information. While our emphasis will be on memory for text, the principles are intended to be general in their application, and should apply with even greater force to more affectively charged events of personal relevance. Next we present a brief outline of an inferential reconstruction model that incorporates knowledge of the world and pervasive experiential coloration in mutually facilitating interactive functioning. Before proceeding, it should be noted that we will be presenting only a very rough overview, something of the "flavor" of our model. Space limitations prevent a detailed explication and justification (interested readers are referred to a more complete exposition forthcoming). For now consider what is offered as less a description of a model than a survey of the selective concerns and values associated with it.

Affect and Memory

There has been intermittent interest over the years in the effects of emotions on memory. A large part of this interest has been in the clinical and personality area and has focused on descendants of Freud's repression hypothesis. This work has, in large measure, proceeded independently of research in cognitive psychology; the constraints of tightly controlled laboratory testing have made it unlikely that methods and results from the experimental tradition would be of use to clinical psychologists, and experimental psychologists have found the relatively loose approach of clinical investigators to produce results too ambiguous to interpret. There has also been sporadic research on such topics as autobiographical memory and memory for emotive events (see, for example, Holmes, 1970; Menzies, 1935). However, this small body of research has failed to produce anything like a unified set of conclusions concerning affect and memory (or even a consensus on the place of such questions within the standard areas of inquiry in memory research).

An exception to the general lack of coherent research on affect and memory is the substantial body of literature that has emerged recently concerning the effects on memory of mental states (such as emotional mood states, states of alcohol intoxication, etc.). For purposes of the present discussion, the main result of interest in the area of state-dependent memory has been that recall is adversely affected when there is a mismatch between mental state at the times of input and output as compared to conditions of state match between input and output. So, for example, a subject with an induced happy mood at the time of learning a text will

exhibit better recall at the time of a later test if he or she is in a happy mood at that time, and will do worse if a sad mood is induced at test (see Bower, 1980, for a partial review of this literature and a detailed discussion of Bower's own research on emotional mood state dependencies).

From our perspective, it seems that state-dependent memory theorists have taken too restricted a view of the role of mental states in memory, and that they have mistakenly considered affective factors to operate in a way similar to other contextual influences. We believe that mental state match is not just an additional factor that affects recall success, like speed of presentation or list length, but rather that state-related processes operate in a different way from discursive contextual influences. That is, we view experiential aspects of representation (i.e., those representational aspects nonarbitrarily related to mental states) and the processes related to them as integral parts of memorial functioning which operate in a representational modality that is relatively independent of discursive representation and which employ different modes of connecting information (pervasive overlays rather than discursive links). The remaining sections of this paper will provide some illustrations of these general claims.

On the Effects of Having a Pervasive Experiential State

A question that seems to be logically prior to that of the effects of state matches and mismatches is the question of what an experiential state is good for in the first place. Naturally, it is hard to imagine a

situation in which a sentient human does not have some mental state. However, it is not at all difficult to construe a dimension of variability in the relative salience, affectivity/neutrality, and pervasiveness of mental states. Thus, one might compare outcomes in which text is processed in the presence or absence of some dominant cohesive experiential quality. We will illustrate such an approach (as well as what we mean by an experiential quality) with a brief discussion of an experiment by Spiro and Crismore (in preparation). Details of our theory will be introduced in the context of that discussion.

In the experiment, very dry and toneless texts about somebody spending a dull evening doing chores around the house were presented with or without an accompanying mood manipulation. The manipulation involved presenting excerpts of poems prior to reading the short texts. The poems were selected to be devoid of semantic or thematic content in any way related to that of the texts. One excerpt was taken from Coleridge's "Frost at Midnight":

> 'Tis calm indeed! So calm that it disturbs
> And vexes meditation with its strange
> And extreme silentness.

Subjects were told (accurately) that the poem had no connection with the passage they were about to read, and that they were merely supposed to get a <u>feeling</u> from the poem (any feeling was satisfactory; they were told that there is no "correct" feeling). They were then asked to keep that feeling in the back of their mind as they read the passage, like background music in a movie. Since there was indeed no semantic connection between

the poem (or its mood) and the text, and since mood-based selectivity of processing was not an issue, demand characteristics resulting from these instructions were not a concern. In other words, the calm poem could not be taken by subjects as a signal to pay more attention to calmness-related information in the passage they were to read. Since general level of performance was at issue, any selectivity based demand characteristics perceived by poem subjects would be irrelevant. It should also be noted that our use of a mood manipulation extrinsic to text content rather than a more preferable intrinsic relation was due to the need to hold constant the content of the passage.

It was expected that the instructions would induce mental states that would simulate calmness (i.e., one might imagine what a calm state would be like without becoming calm), and that these mental states would be (a) dominant (by default, given the dry nature of the texts); (b) pervasive (to the extent subjects are able to keep feelings from the poems in the back of their minds throughout reading the text); (c) experiential (in the sense that mental states are experiences); and (d) qualitative (in the sense that experiences are qualities unless they are described, and it is only the experience and not its description that could account for effects like those discussed below). In other words, we are considering moods to give rise to one kind of experiential quality, a particularly potent kind. Other kinds would include such things as pain, what it feels like to be engaged in a given exercise of abstract relational thought (in contradistinction to the detachable content of that thought), and so on.

By hypothesizing that the induced background experiential states pervasively color the simultaneous discursive representation of the text's content, we are implicitly making a representation assumption as well. Namely, some information is encoded in a manner that produces perceived experiential qualities upon activation (i.e., experience qua experience rather than experience qua description of experience), and that such representational aspects are partially parallel to discursive representation in a way that permits the former to simultaneously overlay or color the latter, as distinguished from parallel representation in the sense of multiple links to a common node in memory. The difference is between constant experiential coloration of a variety of discursive/propositional connections and varying propositional links to a common discursive node. So, the same information may be encoded in two qualitatively distinct modes, that of discursive representation and that of experiential representation (or coloration). The heart of the model concerns the complementary functioning of these two levels, which will be discussed in more detail in the next to last section, where application will be made to retrieval indexing and constraints on the analytic aspect of inferential reconstruction. For now, we will focus on one complementary function, namely that related to the maintenance of integrated memories.

We propose that cohesion of memories can come from two sources: from traditional discursive/propositional connectedness and from uniformity of experiential coloration. The latter refers to similarity of overlays at the experiential level. Thus an alternative basis for keeping memories

together: "noticing" similarities in coloration (as compared to directed associative network search or reconstruction). That is, continuity of overlay may signal common memorial origins and thereby permit not only better discrimination of true from false memories, but also a recognition that certain memories "belong" together. If pervasive coloration is durable, and Bartlett's data as well as various evolutionary arguments (see Spiro, in press) suggest that it is, parts of memories that might become inaccessible over time on grounds of solely discursive linkage will then have an additional source of cohesive glue.

Our pervasive coloration model makes the more specific prediction that experiential cohesion will be more prominent when preexisting discursive knowledge can be expected to provide a less adequate basis for durably connecting information in long-term memory. Thus, where available schemata provide a scaffolding for the specific information in highly detailed and/or abstract text, experiential coloration by mood should be fairly redundant and less preferred (given that discursive encoding allows finer distinctions than does experiential encoding). In the poem study, the texts contained two kinds of information: general classes of chore-type activity (e.g., cleaning, building) and specific instances of the general types (e.g., sweeping the kitchen floor, making shelves for a bookcase). Note that the general types lack strong a priori knowledge scaffolding (when you clean you do not necessarily also build, work on your slide collection, etc.), while the specific actions do have some connection in prior knowledge (when you sweep the floor you also often vacuum the rug). If the experiential coloration is complementing

schema-based cohesion in memory, the effects of the poem's background mood induction should be far greater for memory of the general chore types (which are not strongly related to a common schema) than for the specific instances of the general types (which are so related).

The predictions of the pervasive coloration model were upheld in the poem experiment. At 2-3 week delays subjects in the poem condition recalled significantly more of the texts than subjects who did not have artificially induced background moods. With regard to the complementarity hypothesis, poem subjects recalled significantly more of the general categories than control subjects, but there was no effect of background mood induction on the recall of specific instances given that their general types were recalled.

Note that the complementarity result also militates against the most potent alternative to the pervasive coloration interpretation, viz., that subjects were using the poem as a basis for constructing an elaborated image of the story character carrying out his chores (for example, imagining each chore being done very calmly). It defies the imagination that subjects would form elaborated images at the level of abstract general categories of activity (such as cleaning) and not at the level of the specific concrete instantiations of those abstract general classes (such as sweeping the kitchen floor). A similar argument may be provided against interpretations which invoke selectivity in traversing associative networks, such as that offered by Bower for his mood-related selectivity effects: our experimentally induced background mood was not semantically related to any of the information in the text and thus could not selectively enhance memory for

portions of the text. Also, the poems clearly did not simply aid passage differentiation, since there were very few passage confusions even in the control condition.

Pervasive Coloration Effects and Arousal

The pervasive coloration model attributes long-term cohesion effects to the availability and consistency of experiential representation derived from background mental states, not to the level of general system arousal produced by those states. The poem experiment provides support for the former and against the latter interpretation: clearly, background moods like calmness are anything but arousing! On the other hand, pervasive coloration effects in the poem experiment are not likely to be due to relaxation or tranquilization since we found effects on memory with experimentally induced background moods of turbulence, just as we did with induced calm moods.

Regional and Hierarchical Experiential Landmarks

If experiential backgrounds or overlays are to be of general utility, they must have a further characteristic beyond those proposed so far: they must be regionally and hierarchically applicable. It is probably rare that a single experiential quality will pervade any but the briefest of texts. Or, where such a quality can be detected (as, for example, in some literary texts), there will also be local refinements, alterations, and deviations from that superordinate quality. Our developing model therefore incorporates a principle of multi-leveled control by pervasive

coloration. By this we simply mean that different coloration patterns will overlay different parts of the discursive representation (e.g., a feeling of suspense in the early part of a story and a feeling of resolution towards the end), and/or different levels of abstraction of discursive representation (e.g., there may be coloration at the category level, as in the poem experiment, or at the level of concrete specifics).

The Complementarity of Schema-Based and Experiential Reconstruction Processes

The assumption has been made that information is ended in two languages": discursive/propositional and experiential representation. When both of these modes contain information about the same topic (sometimes information in the experiential mode will not be used to overlay discursive representations), the two modes complement each other. That is, they each help to fill in gaps in the other, and they constrain each other (i.e., when there is some overlap, they provide mutual tests or checks and balances). Thus, the two modes provide a basis for: (a) encoding more information than the analytic/discursive channel alone would permit; and (b) progressive mutual refinement and error constraint, a process we now turn to.

When a regional experiential landmark is "retrieved" it provides a context (a qualitative criterion) for analytic, discursively based reconstruction. Crudely put, schema-based inferences must "feel right" (i.e., produce experiences that conform to the criterion) besides "making sense" (i.e., generating propositions that conform to discursive/analytic criteria).

In turn, as analytic reconstruction proceeds, more specific memories will become accessible along with their experiential overlays. The further along in the process one is, the more locally specific the overlays will be, thus permitting more refined criteria for further analytic reconstruction, and so on. Or, when reconstruction is proceeding from the specific to the general, more encompassing overlays will be detected later in the process. So, for example, qualitative criteria for the recall of categories (rather than specifics) may become available. In summary, a memory system like that we have proposed benefits from having two different subsystems that provide checks on each other: the schema-based inferential reconstructions must conform to the regional experiential landmarks (reducing the possibility of a chain of plausible but incorrect inferences from being generated), and the experiential landmarks are kept in check by schema-based knowledge of the world (feelings and "intuitions" must meet an analytic test). However, the independent representational subsystems not only provide checks on each other, but they also provide external guidance or direction to improve functioning in each representational system. So, for example, when schema-based processing reaches a deadlock, the experiential landmarks provide another source of ideas or reconstruction candidates. Thus instead of following a discursive path through memory (if such a course has been unavailing), one might try to generate information that would have some target coloration. The end result of the "external criterion" and retrieval guidance functions of the two subsystems is an economical convergence in the production of a complete memory.

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